Position Paper

on

OCEANIC, ATMOSPHERIC AND EARTH SCIENCES ADMINISTRATION

in the proposed

Department of Natural Resources

DRAFT

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OCEANIC, ATMOSPHERIC AND EARTH SCIENCES ADMINISTRATION (OAESA)

1. BACKGROUND

Papers relating to the President's Departmental Reorganization Program released to the public in March 1971 said the following concerning the proposed Oceanic, Atmospheric and Earth Sciences Administration (OAESA):

"Federal efforts to increase knowledge of the physical environment and to improve our ability to predict and modify geophysical phenomena, would be brought together into one component. So organized, these programs can better serve to help us understand the earth, its waters and atmosphere, and the physical processes that govern our planet. There is now a realization of the interactions of the oceans, the atmosphere, and lands in predicting weather and understanding the causes of natural disasters. The functions of this component are:

National weather services;
Resource and environmental remote sensing studies;
Operation of environmental satellites;
Geologic and soil investigations and surveys;
Water data collection and investigations;
Environmental data services;
Earth hazard programs (earthquake, volcano, landslides, etc.):
Predictions of natural hazards and warnings for public health and safety;
Topographic and other mapping and charting services;
Ocean and lake surveys, investigations and research;
Fishery resources management, research, and assistance to industry;
Research and information services;
Technical and financial assistance to States.

The organizational entities that would be transferred to this component are:

From Interior: Geological Survey.
From Commerce: National Oceanic and Atmospheric Administration.

Both the Geological Survey and NOAA combine scientific skills with data gathering and dissemination services required

by many different users. Much of the activity of both agencies is carried out for other Federal agencies. In some earthquake, hydrology, and mapping activities, they conduct similar and sometimes overlapping operations. These duplications should be eliminated by bringing the two organizations together.

There are also major opportunities for consolidating and improving related surveying, mapping and charting programs that now exist within these organizations.

Because the services of NOAA are widely used, no compelling logic dictates its location in any specific department. However, when NOAA is combined with the Geological Survey and related science service activities, the resulting entity has closer ties to the proposed DNR than any other Department. For example, the marine resources programs of NOAA are related to DNR responsibilities regarding the development and use of off-shore oil, gas, and other mineral resources. For that reason, an "Oceanic, Atmospheric and Earth Sciences" component of the DNR is proposed to emphasize that this agency serves all components of the new Department, as well as other government agencies and private users."

2. DISCUSSION

Increasing populations are occupying more land, consuming more food, utilizing more water, and converting more of the earth's resources into products and wastes each year. Because the earth is a finite system, these changes cannot occur without altering the environment; and because the ecological system of living and nonliving things is an extremely complex one, there is still far too little capability of predicting natural phenomena and human effects, and still less capability of controlling them.

Modern societies simultaneously are demanding more worldly goods -- e.g., processed resources -- and more safe and attractive

surroundings. For this reason, there is increasing contest between those who must develop the resources we need and those who hope to preserve them. Proper compromise between these desires and points of view can be reached only through accurate assessment of environmental factors and the impacts of necessary resource developments. Fulfillment of this objective has been hampered not only by difficulty in developing reliable unbiased data upon which to make such assessments, but by the fact that this assessment capability is scattered in many departments.

Recent suggestions for establishment of a separate department for science and technology and related proposals for establishment of environmental laboratories to provide multi-disciplined analysis of natural processes, resource needs and development effects are efforts at overcoming this dilemma. The Oceanic, Atmospheric and Earth Sciences Administration (OAESA) embodied in the President's proposal for a Department of Natural Resources (DNR) will fill this void by pulling together in a separate part of a large resource department the powerful earth and atmospheric science and service capabilities of the U.S. Geological Survey and NOAA.

The combination of Geological Survey's scientific and technical capabilities in geoscience, hydrology, topography, geography, and earth resources remote sensing with those of

NOAA in atmospheric science, oceanography, geodesy, geophysics, marine biology, and metereological satellite technology will provide OAESA with the broadest spectrum of resource and environmental scientific expertise within the Federal Government. It will provide the multi-purpose technical, scientific, and predictive capability required to support the diverse resource management missions of DNR and environmental enhancement programs of other Federal, State and local agencies. It will continue to meet as well, the needs of the public and private sectors for those environmental services now provided by NOAA and USGS.

Within OAESA, present basic research and information gathering capabilities of Geological Survey and NOAA will be strengthened and enhanced by integration of programs where desirable and by joint utilization of research capabilities and information exchange, where program integration is not appropriate. This will allow for optimum use of OAESA's resources in rendering environmental services and predicting the environmental consequences of planned actions. Organizationally, OAESA will be in a unique position to provide the firm foundation of objective data, analyses, evaluation and forecasts required to assessthe difficult and crucial "trade-offs" between competing demands for development and conservation of resources and environment. It will be closely related to the development and management-oriented agencies of DNR, yet will possess the

essential autonomy and freedom from bias so critical to the effective use of the information and analysis which it provides.

3. OBJECTIVES

In support of DNR's management missions and in response to more broadly distributed needs for resource and environmental information within Government and the public at large, OAESA's objectives will be to provide the understandings of the earth, its waters, the atmosphere, and the physical, chemical, and biological processes that govern our planet; to develop a sound information base for policy analysis, planning, development and management; and to monitor and predict the natural environment and effects of man's impact upon it.

4. FUNCTIONS

1. Through surveys, investigations, observations and research, acquire, interpret, predict, and disseminate information with respect ot the physical characteristics, processes, resources and environment of
   - -- The solid earth and its surface and subsurface waters
   - -- The oceans
   - -- The atmosphere
   - -- Marine and anadromous fish and related biological resources
   - -- The space environment and the sun

   and the relationship of Man to these environmental systems.
2. Based on the above, provide resource and environmental analysis including predictions of environmental response to alternate plans of action, necessary for policy evaluation and decision, planning, development and management.
3. Provide geodetic data and measurements, and topographic, nautical and aeronautical maps and charts.
4. Develop in collaboration with NASA environmental and resource remote sensing systems.
5. Provide systems for production, storage, retrieval and dissemination of geologic, hydrologic, oceanographic, climatologic upper atmosphere and space environmental data, maps, charts, research publications and other information.

6. Provide predictions and warnings of environmental phenomena and hazards.

7. Investigate and determine feasibility and consequences of beneficial modification and control of environmental phenomena.

8. Support of education and training in resource and environmental science.

9. Provide marine biological resource research and management assistance.

10. Evaluates and supervise development of mineral resources of the public lands and the Outer Continental Shelf.

5. EXPECTED IMPROVEMENTS

1. Strengthened Capability for Environmental Analysis

Typically, problems of environmental analysis, including related resource considerations, involve a wide variety of interacting physical, chemical, biological, cultural, and ecological factors and conditions. At the present time, no one agency possesses expertise in a majority of the keys areas and most are dedicated to specific management missions. As a result, there are significant problems in coordination, in achieving desired breadth and diversity of perspective, and in evaluation and decision-making.

The Geological Survey in its recent publication, "Procedure for Evaluating Environmental Impact", identified

88 specific physical, biological, cultural and ecological factors for consideration in environmental impact analysis. Exhibit 1 displays in summary the competence which can be expected to be available in OAESA and DNR to make such evaluations.

OAESA would posses expertise in all identified physical and chemical characteristics related to the earth, the water, the atmosphere and related processes; biological factors with respect to marine and anadromous fish and related biological resources; cultural factors related to land use; and some ecological relationships. As indicated in Exhibit 1, other elements of DNR would further broaden the Departmental capability.

The broader spectrum of scientific talent and resources which OAESA will bring to bear on environmental analysis will improve, strengthen, and enhance the objectivity of the resulting assessment. It constitutes one of the most important strengths of the new organization and provides a base for extension and diversification of scientific capability and environmental information services in the future.

2. Closer Relationships with Federal Clientele

Certain users of the information, data and research of OAESA would be within DNR, or be funded through DNR, under the President's reorganizational proposal. Corps of Engineers'

civil functions, the Forest Service, the Soil Conservation Service, and the Atomic Energy Commission are significant users of OAESA information. Under overall DNR management, information, data, research, and environmental service functions of OAESA can be better tailored to serve the major resource and environmental action agencies. This would constitute a second important area of expected movement.

Exhibit 1

EXPERTISE RELATIVE TO ENVIRONMENTAL IMPACT ASSESSMENT

Existing Characteristics & Conditions of the Environment [1]	OAESA Expertise	OAESA USGS	OAESA NOAA	Other DNR
A. PHYSICAL AND CHEMICAL CHARACTERISTICS				
1. Earth	6 of 6 subcategories	*	*	*
2. Water	7 of 7 "	*	*	
3. Atmosphere	3 of 3 "		*	
4. Processes	9 of 9 "	*	*	*
B. BIOLOGICAL CONDITIONS				
1. Flora	1 of 9 subcategories			*
2. Fauna	2 of 9 subcategories		*	*
C. CULTURAL FACTORS				
1. Land Use		*		
2. Recreation				°
3. Aesthetic & Human Interest				°
4. Cultural Status				
5. Man-made Facilities and Activities				
D. ECOLOGICAL RELATIONSHIPS (examples)				
(a) Salinization of Water Resources		*		
(b) Eutrophication		*	*	
(c) Disease-insect vectors				
(d) Food Chains				
(e) Salinization of surficial material		*		
(f) Brush encroachment				

[1] Major categories of environmental characteristics and conditions from Environmental Impact Assessment Matrix, Plate 1, USGS Circular 645.

* Scientific knowledge

° Special expertise relative to cultural factors (e.g. National Park Service, Bureau of Outdoor Recreation, Sports, Fish and Wildlife)

3. Better Program Coordination

There is considerable commonality among present programs of Geological Survey and NOAA, e.g., geodetic control (NOAA) and topographic mapping (USGS); topographic mapping (USGS) and bathymetric and aeronautical charting (NOAA); flood frequency and inundation mapping aspects of river hydrology (USGS) and weather service river and flood forecasts (NOAA); water use inventories (USGS); water supply forecasts from meterological analysis (NOAA); related marine studies on the continental margin (USGS-NOAA); complementary earthquake, seismologic, and crustal studies (USGS-NOAA). Under OAESA,programs can be designed and priorities set to take best advantage of such mutually supporting activities.

4. Better Service to the Public

Both Geological Survey and NOAA provide many products and services to the public. OAESA will make it possible to consolidate systems for dissemination of a broad array of maps, data and research findings and permit them to be acquired by the public more conveniently and efficiently. For instance, a single national map service to provide maps, charts and aerial photographs to State and Federal agencies and to the public could easily be achieved under such an arrangement.

5. Combining Support Functions

Many activities of the two agencies require similar types of in-house facilities or functions, e.g., computer service, ships and other facilities for marine studies, laboratory facilities, logistical support facilities for storing and disseminating information, automated data storage and retrieval systems. Common management would provide for consolidation of many facilities and functions and mutual sharing of others.

6. Better Products

In some cases, data produced by one agency are used as working material by the other to produce a final product or result. Examples would be: USGS topographic maps used as working base for NOAA's preparation of aeronautical charts; NOAA's geodetic data used by USGS in topographic mapping; USGS topographic maps of shore areas used in the preparation of NOAA navigational charts; NOAA's bathymetric charts used as the plotting base for USGS marine geologic studies; NOAA's seismologic information used in USGS earthquake research; geophysical data used in crustal studies; oceanographic data used in Coastal Zone and continental margin geologic, hydrologic, and sedimentation studies. In other cases, networks and data systems of one agency serve needs of the other -- for instance, use of the Geological Survey streamflow monitoring network in NOAA's flood forecasting and subsequent use of these forecasts to deploy USGS personnel to monitor flood events.

Under common management, many existing programs which are now coordinated between Geological Survey and NOAA would be candidates for consolidation.

6. SPECIFIC EXAMPLES OF IMPROVED ADMINISTRATION

Summarized below are a number of functions or activities currently carried out by Geological Survey and NOAA which offer opportunity for significant improvement in administration under OAESA.

A. Example 1. Environmental Analysis and Prediction for Resource Management Decisions

The Geological Survey and NOAA are both particularly well equipped to make the environmental analyses required for preparation of environmental impact reports under Section 102(2)(c) of the National Environmental Policy Act of 1969. Many of the constituent agencies of DNR are heavily involved in preparation of impact reports. Within DNR, the Secretary would occupy a crucial decision-making role, having under his direction both the major analytic and forecasting capability of OAESA and the major resource and environmental management agencies.

To illustrate the types of management improvement which might be expected under DNR, we have analyzed the chain of responsibility, evaluation, and decision-making under present organizational arrangements, and under DNR, using as a case study the proposed Pine Mountain phosphate development.

The Pine Mountain phosphate proposal is representative of the multi-faceted character of many environmental issues. The proposed development is so located that careful attention must be given to its possible effect on the few remaining California Condors, one of our most endangered species. The birds are sensitive to noise, and the possible impact of blasting, drilling, and equipment operation associated with mining must be carefully evaluated prior to decision. Potential problems of water and air pollution from drainage modification and industrial operations must also be carefully evaluated, and impacts on fishing, camping, and hiking considered.

On the other hand, 7.5 million tons of phosphate, worth over $50 million will be produced if the proposal is approved. It is, therefore,important that there be a careful weighing of the need for the resource against possible environmental consequences of its extraction from the earth.

The Pine Mountain development, as proposed, would occur on Forest Service lands under lease proposed to be granted by the Bureau of Land Management, with lease supervision by the Conservation Division of the Geological Survey.

With the establishment of DNR, improvements would occur in a number of ways. The simplification of analysis, review and management decision-making is shown diagramatically in Exhibit 2; the primary areas of improvement are discussed below:

PINE MOUNTAIN PROPOSAL

ENVIRONMENTAL IMPACT STATEMENT-PHOSPHATE MINING

PRESENT PROCEDURE

INTEREST	AGENCY
Leasing	*Land Management
Lease Supervision	*Geological Survey
Water Quality	
Deposition	
Sedimentation	
Geology	
Resource Considerations	
Endangered Species	*Fish & Wildlife
Fishing	
Camping & Hiking	*Outdoor Recreation

INTERIOR

Noxious Gases	*NOAA
Precipitation	

COMMERCE

Owns the Land	*Forest Service
Erosion Control	*Soil Conservation Service

AGRICULTURE

Maintain Water Quality	*Water Quality Office
Prevent Air Pollution	*Air Pollution Control Office

EPA

CEQ

Executive Decision

AFTER ESTABLISHMENT OF DEPARTMENT OF NATURAL RESOURCES

CEQ

Policy Determination

Consultation (as needed)

DNR

INTEREST	AGENCY
Owns the Land (FS)	*Land & Recreation Adm.
Lease the Land (BLM)	
Endangered Species (F&W)	
Fishing (SF)	
Camping & Hiking (OR)	
Lease Supervision (GS)	*OAESA
Water Quality (GS)	
Deposition	
Sedimentation	
Geology (GS)	
Resource Considerations (GS)	
Noxious Gases (NOAA)	
Precipitation (NOAA)	
Erosion Control (SCS)	*Water Resources Adm.

EPA

Maintain Water Quality	Water Quality Office
Prevent Air Pollution	Air Pollution Control Office

DNR - Department of Natural Resources

CEQ - Council on Environmental Quality

NOAA - National Oceanic & Atmospheric Administration

EPA - Environmental Pollution Agency

OAESA - Oceanographic, Atmospheric, & Earth Science Administration

* Recommendation for Executive Decision

PRESENT PROCEDURE

1. Three departments and one agency recommending approval, disapproval or change regarding the environmental impact statement.
2. Three departments and one agency engaged in reviewing those segments of the impact statement that fall within their particular expertise.
3. CEQ frequently presented conflicting recommendations. Must serve as arbiter.

AFTER ESTABLISHMENT OF DNR

1. One department, in consultation with EPA, makes executive decision. CEQ reviews.
2. Time consuming inter-departmental review process sharply reduced.
3. CEQ establishes policy, rather than serving as arbiter of conflicting recommendations.

a. Consolidation of analysis responsibilities.

In the Pine Mountain case, environmental analysis involves the expertise of Geological Survey with respect to physiographic, hydrologic and geologic factors and of NOAA with respect to atmospheric, precipitation and related stream flow considerations. Other DNR agencies would contribute to the analysis, within their missions -- Forest Service with respect to vegetation and national forest considerations; SCS with respect to soil qualities, soil/plant relationships and erosion; the Bureau of Sport Fisheries and Wildlife with respect to effects on the Condor and other fish, wildlife and aesthetic considerations. The only considerations of significance not within the capability of DNR are those of EPA -- namely, the enforcement aspect of environmental quality control. EPA would, of course, retain responsibility for assuring that controls incorporated in the selected development alternative conform to established environmental quality standards.

Combining the above mentioned responsibilities of Interior, Agriculture, and Commerce for environmental analysis would reduce to one the number of agencies with which EPA must coordinate its environmental quality control responsibilities.

b. Simplification, within DNR as a whole, of proprietary and management structure

The Forest Service and BLM responsibilities along with the fish and wildlife and recreational concerns of other present Interior agencies, consolidated within the Land and Recreation Resources Administration (LRRA) will provide a simple and straightforward management arrangement to deal with the Pine Mountain proposal. One Administration (LRRA) of one Department (DNR) would replace the two Departments (Agriculture and Interior) and numerous Bureaus involved under the present organization.

c. Improved decision-making

Responsibility for environmental analysis would be largely encompassed by OAESA with remaining contributions from other elements of DNR. This would enable DNR to make sound resource management decisions not only on specific developments such as Pine Mountain but on major environmental issues which then could be passed directly to the Executive Office of the President for review and appropriate policy decision.

B. Example 2. Mapping and Charting

The Task Force Report on the Department of Natural Resources notes "major opportunities for consolidating and improving related surveying, mapping, and charting programs that now exist within these organizations (NOAA and Geological Survey)."

NOAA and the U.S. Geological Survey have within their present structure the Nation's strongest and most experienced civilian organizations in the field of surveying and mapping. Integrating the operations of these two organizations would provide powerful means for meeting the pressing needs of the Nation for reliable maps, charts, and surveys. Advantages would occur in a number of ways:

- Data collection (aerial, photography, space data, field surveys, toponomy, etc.) would be coordinated for multiple use.
- Overlap of operations would be eliminated.
- Expensive equipment, such as computers, printing presses, precise measuring and plotting instruments, and aircraft would be more fully utilized; integrated use of very expensive satellite systems can be anticipated in the more distant future.
- Projects and programs would be better coordinated.

- Expertise in research and development would be pooled.
- Publication and distribution of products would be carried on more efficiently, at a reduced cost, and with more convenience to the public.
- Interchangeability of personnel would improve flexibility of staff and operations to meet changing needs.
- Facilities for training personnel would be strengthened.
- Use of the unique classified facility and capability now in Geological Survey would also be considerably extended.
- Management functions, such as budgeting, planning, personnel administration, procurement, and accounting would be coordinated or consolidated.
- Additional opportunities for change and improvement would undoubtedly develop as the two organizations proceed to function in an integrated fashion.

Improvements, which would affect a wide range of activities now carried on by both agencies, are summarized in Exhibit 3.

C. Example 3. Hydrologic and Climatologic Information

The National Oceanic and Atmospheric Administration and the U.S. Geological Survey are the major Federal agencies involved in collecting basic data on the water cycle and forecasting water supplies and related phenomena. Both are concerned to some extent with every element of this single system involving

Exhibit 3

SURVEYING, MAPPING, AND CHARTING FUNCTIONS

OF OAESA

ACTIVITY	EXTENT	PRODUCTS	IMPROVEMENTS THROUGH CONSOLIDATION WITH DNR
Aerial photography	USGS - large NOAA - large	Aerial photographs;aerial mosaics; enlargements; rectified prints; orthophotographs	Unified planning and procurement; more efficient utilization of photolab facilities
Geodetic surveys	USGS - large (principally secondary surveys) NOAA - large (principally primary surveys)	Geodetic control; map control	Unified planning; consolidation of field operations and computations; consolidated use of geodetic instruments; consolidated distribution of geodetic information
Topographic mapping	USGS - large NOAA - limited	Conventional topographic maps; orthophotomaps	Closer integration of NOAA geodetic surveys with USGS topographic mapping program; consolidation of publication facilities
Aeronautical charting	USGS - none NOAA - large	Aeronautical charts; aeronautical data	Interchange of personnel and equipment in operations common to charting and mapping; consolidation of publication facilities
Nautical charting	USGS - none NOAA - large	Nautical charts; lake charts; navigation data; bathymetric maps; hydrography	Closer integration of topographic mapping and map revision with nautical charting; interchange of personnel and equipment in operations common to charting and mapping; consolidation of publication facilities
Coastal mapping	USGS - large NOAA - large	Topographic maps inland from water's edge Nautical charts; tidal data	Unified planning; integrated production of land and hydrographic maps of coastal zones
Space technology for maps and surveys	USGS - moderate (future - large) NOAA - large	Cartography output of EROS program Geodetic satellite data	Unified planning; consolidated use of data
Special maps	USGS - large NOAA - moderate	Thematic maps; maps of areas of special interest; National Atlas	Unified planning; more efficient use of personnel and equipment
Information on maps and related subjects	USGS - large NOAA - large	Control data; map data; aerial photo data; research reports;scientific papers;replies to specific inquiries	Improved service to the public by establishment of National Cartographic Information Center
Research and development	USGS - moderate NOAA - moderate	New and improved procedures and instruments	Combined use of expensive research equipment;avoidance of duplication;pooling of scientific talent

oceans, atmospheric moisture, rivers, estuaries and ground water reservoirs. Their combined strengths can provide an excellent information system for dealing with problems of water supply and pollution control, floods, and droughts. A major benefit of OAESA will be integration of these capabilities for research, monitoring, analysis, and forecasting and provision of broader and more useful information on water as an environmental agent and a resource. Expected improvements in data systems, forecasting services, and research are discussed below.

Data Systems

Reliable, timely information on hydrologic processes and water availability is essential for managers concerned with resource development, environmental protection and human welfare. NOAA and USGS together provide to other Federal, State, local, academic, industrial and general interests, a variety of hydrologic and terrestrial water resource information of the kinds listed below.

Daily Forecasts of weather for general purpose use, streamflow forecasts, specialized services for agricultural use, aviation, etc.

Data Releases such as monthly, quarterly, and annual meteorologic and water-resource data summaries for individual States and nationwide.

Interpretive Reports of research results on investigations in atmospheric and hydrologic sciences.

Summaries of geographic water resource appraisals.

Public Information Services including leaflets, brochures and flyers.

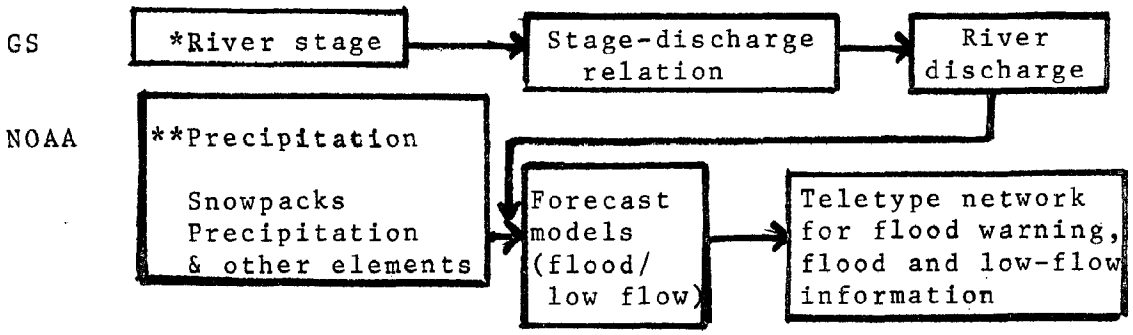
Press Releaseson atmospheric and hydrologic events.

Periodicals including Water Resources Review and Climatological Summaries.

The consolidated system will permit professional talents, personnel, and facilities of the two agencies to be better utilized. Data analysis and publications for the laymen could be made to cover the entire hydrologic cycle in one series of documents instead of the present three or four. Public inquiries could be directed to and handled by a single well integrated system. Computer software and hardware could be consolidated and programmed for greater efficiency and improved service in releasing resource data and forecasting environmental hazards.

Forecasting

There is particularly great potential for improvement in forecasting and reporting of natural phenomena such as floods and droughts as well as for water supply forecasting. The diagram below illustrates present data input systems for flood and low-flow forecasting which involve working agreements for supplying data from GS stream gages to NOAA for use in their digital models and eventual release to national news media networks.



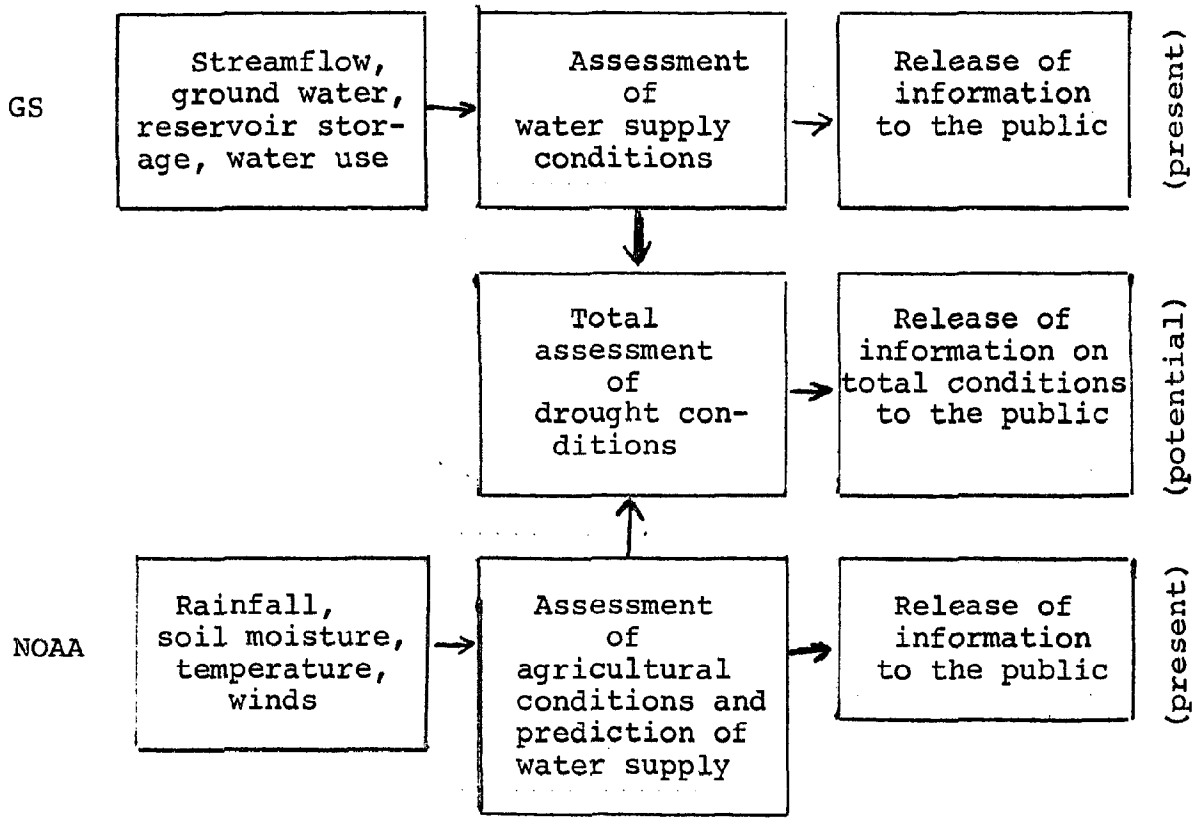
*NOAA also collects real time stage data for forecast purposes.
**GS and SCS also collect information on water equivalent of snow and ice on ground.

At present NOAA and USGS operate essentially independently within this cooperative system to analyze and disseminate the basic data it involves. Pooling professional talents and systems would provide more capability and greater efficiencies in an operation of this kind.

The following diagram uses the Southwest drought to illustrate current parallelism in activities and interests of the two agencies. In each case operations start with data collection and end with release of information to the public. The possible benefits of providing a single consolidated system for this relatively cumbersome linkage is evident.

Southwest Drought

Data Collection, Assessment and Release



RESEARCH

The hydrologic research in NOAA is largely directed towards the improvement of its flood and water supply forecasting service. Much of this research is closely related to that performed by the USGS in carrying out its responsibilities. Similarly, both agencies conduct research in evaporation and have in fact conducted joint projects at Lake Mead, the Salton Sea and elsewhere. The consolidation of these activities in a single agency would most certainly result in increased efficiency and greater scientific progress.

D. Example 4. Earthquake Hazard Reduction Programs

Geological Survey and NOAA are the principal civilian agencies carrying out in-house research and data gathering on crustal phenomena and seismic activity related to earthquake hazard reduction. Within their present structures, these agencies possess the strongest and most experiencedorganizations in the United States in the field of earthquake research and monitoring.

The union of these two agencies within the same Department would result in the following advantages in studies of earthquakes:

1. Data collection would be integrated for multiple use (strong motion and microearthquake data, strain data, geodetic surveys, etc.).
2. Integration of earthquake and strain nets.
3. Expensive equipment such as computers, precise measuring and plotting instruments, seismographs, tiltmeters, and ships would be more fully utilized; integrated use of very expensive satellite systems can be anticipated in the more distant future.
4. Planning and scheduling of projects would be better coordinated.
5. Expertise in research and development would be pooled.
6. Publication and distribution of products would be carried on more efficiently and at a reduced cost, with more convenience to the public. This type of joint effort between NOAA and the USGS resulted in a timely joint publication, "The San Fernando, California Earthquake of February 9, 1971," USGS Professional Paper #733.
7. Management functions such as budgeting, planning, personnel administration, training, procurement, and accounting would be integrated or coordinated.
8. Additional opportunities for change and improvement would undoubtedly develop as the two organizations proceed to function in close coordination.

To illustrate the improved administration that would result, the following examples are cited:

In the major programs, geologic hazards (U.S.G.S.) and seismic risk mapping (NOAA), the consolidated effort can result in greater quality as well as quantity of products through the integration of geologic and geophysical expertise of the U.S.G.S. with the seismic data system and specialities of NOAA. The ready availability of strong motion data from NOAA and the immediate input of microearthquake information from the U.S.G.S. are essential for needed accelerations in mapping of geologic hazards and seismic risks.

Another important task which would be greatly facilitated by combining NOAA and the U.S.G.S. in the same department is post-earthquake studies, which provide the opportunity, if response is swift, to learn a great deal about earthquakes. After the San Fernando earthquake, the need for instantaneous response with portable recording equipment over broad regions, and as nearly as possible instantaneous observations taxed both agencies beyond capacity. The close coordination which would result from consolidation of NOAA and USGS in a single Department would more nearly assure that vital but short-lived ephemeral phenomena are adequately recorded and analyzed.

Opportunities for improvement are summarized in Exhibit 4.

Exhibit 4

FUNCTIONS IN SEISMOLOGY, GEODESY, AND STRAIN MEASUREMENTS

USGS and NOAA

ACTIVITY	EXTENT	PRODUCTS	ADVANTAGES OF DNR ADMINISTRATION
Seismic Risk Mapping	USGS - None NOAA - Large	Earthquake Risk maps	Coordinated research by NOAA seismologists and USGS geologists and geophysicists utilizing NOAA's seismic data bank should result in an integrated tectonic seismic approach to seismic risk mapping and seismicity maps.
Geologic Hazard Mapping	USGS - Large NOAA - None	Maps of physical properties of rocks, and landslides and subsidence susceptibility.	Coordinated planning of earthquake hazard research integration of geologic and geophysical expertise of the USGS with the seismological data system and specialties of NOAA.
Strong Motion Studies	USGS-Small NOAA- Large	Data bearing on response of structures to earthquake energy.	Greater accessibility of strong motion data for geologic interpretations. Broadened application of data.
Microearthquake Studies	USGS- large NOAA- Small	Data on location and nature of subtle faults; information for earthquake prediction research.	Exchange of data and combined use of equipment, integrated seismic network avoidance of duplication of effort.
Geodetic Research	USGS - Medium NOAA - Large	Geodetic measurements of tectonic strain accumulation and displacements along faults.	Combined efforts will result in development of greater precision data necessary for successful earthquake prediction.
Tsunami Hazard Research	USGS - Small NOAA - Large	Tsunami warning information	Provide more meaningful and reliable Tsunami warning data through improved basic understanding of Tsunami generation.
Seismology Research	USGS - Large NOAA - Medium	Basic information for earthquake prediction and control and data on rapid location of epicenters.	Coordinated planning and rapid exchange of data; increased understanding of seismological response of the earth through combined capacities of NOAA and USGS.

Example 5. Coastal Zone and Outer Continental Shelf Activities

The Coastal Zone and Outer Continental Shelf comprise areas of extensive interface between activities of USGS and of NOAA.

Geological Survey activities in the Coastal Zone include topographic mapping to the waters' edge; hydrologic investigations of coastal waters, water quality monitoring and analyses in the estuaries and extension of onshore geologic mapping and analysis and associated geophysical surveys onto the Outer Continental Shelf; earth resource remote sensing activities with respect to solid earth,hydrologic and biologic phenomenon of concern to Interior; and management of resource development activities on the Outer Continental Shelf, primarily oil, gas, sulfur, sand and gravel.

NOAA is involved in the Coastal Zone and Outer Continental Shelf with respect to oceanography, meterology, climatology, and air-sea interface phenomena, as well as marine charting, and bathymetric surveys, and biology of estuaries and coastal waters, the sea grant program, seaward boundary determination, Federal aid to fisheries, and environmental quality as it relates to marine fisheries.

Some of the more significant opportunities for improvement are: More effective use of research ships and support facilities; a broadening of disciplines involved in solution of Coastal Zone

problems; improved planning and project design based upon unified program priority determinations; standardization of certain products, such as land-sea transect maps, depicting both land topography and sea floor bathymetry; consolidation of publication functions and consolidation of marine geophysical programs.

Example 6. Remote Sensing Programs

Both NOAA and Interior -- under Geological Survey's leadership -- have major programs for use of remote sensing in support of agency missions.

NOAA has an operational program in environmental remote sensing satellites with supporting ground oceanographic, and space environmental data systems for analysis of metereological patterns and forecasting of related phenomena.

Interior is developing an earth resources satellite system to provide a third generation of techniques for inventorying earth resources, land use patterns and environmental quality trends.

OAESA provides opportunity for combination of appropriate elements of these two advanced technologies into a single continuing monitor of air, land, water and the interactions they involve.

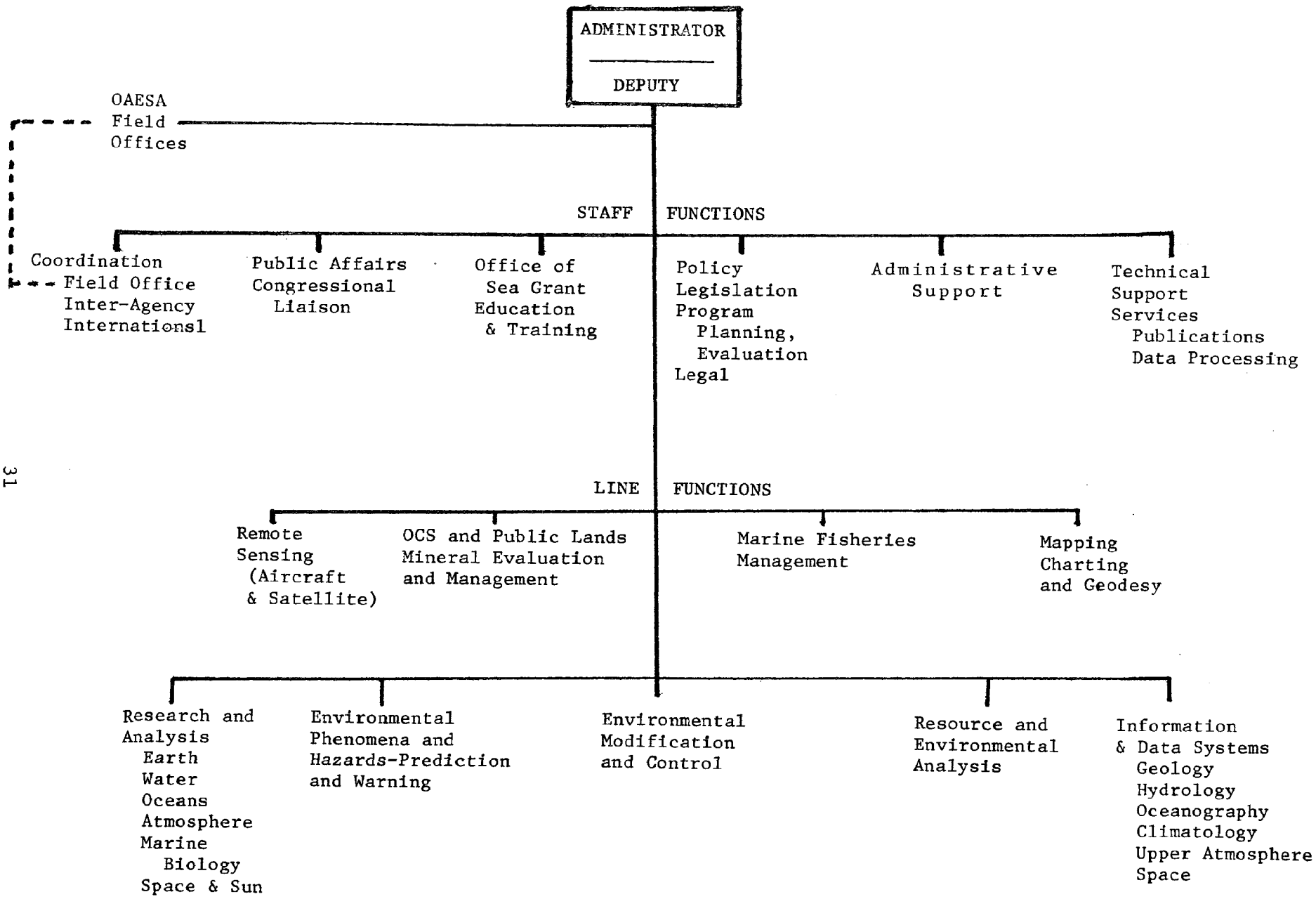
Present cumbersome coordination of remote sensing research and development, operations and administration through NASA, the Space Council, Office of Space Science and Applications

(NASA), Committee on Scientific and Technical Information (FCST), and Earth Resources Survey Program Review Committee, would be materially improved. Coordination within the primary areas of civilian application of remote sensing, would be achieved through conventional management procedures within OAESA. In addition, the establishment of a single agency - OAESA - to represent many mission agency requirements should simplify problems of coordination with NASA.

7. ORGANIZATIONAL CONSIDERATIONS

1. Line and Staff Functions

The basic character of OAESA is different from the rest of the DNR. Its mission is the definition and understanding of the environment in the broadest sense. The proper organizational configuration of an agency to pursue such a broad mission is subject to a wide variety of approaches. The most appropriate can best be developed within DNR as its internal organization and the many policies, methods, and procedures are developed over the period of its initial formation. It is important that decisions about organizational components and operating procedures that should properly be made by the Secretary and the OAESA Administrator not be pre-empted at this stage. Hence, the organization is depicted (Exhibit 5) in terms of its functions and salient characteristics, rather than as proposed organizational components.


ADMINISTRATOR
DEPUTY
OAESA
Field
Offices
STAFF FUNCTIONS
Coordination
Field Office
Inter-Agency
Internationsl
Public Affairs
Congressional
Liaison
Office of
Sea Grant
Education
& Training
Policy
Legislation
Program
Planning,
Evaluation
Legal
Administrative
Support
Technical
Support
Services
Publications
Data Processing
LINE FUNCTIONS
Remote
Sensing
(Aircraft
& Satellite)
OCS and Public Lands
Mineral Evaluation
and Management
Marine Fisheries
Management
Mapping
Charting
and Geodesy
Research and
Analysis
Earth
Water
Oceans
Atmosphere
Marine
Biology
Space & Sun
Environmental
Phenomena and
Hazards-Prediction
and Warning
Environmental
Modification
and Control
Resource and
Environmental
Analysis
Information
& Data Systems
Geology
Hydrology
Oceanography
Climatology
Upper Atmosphere
Space

2. OAESA Field Structure

Many of the functions of the Oceanic Atmospheric and Earth Sciences component are of such a nature that they do not have the same type of regional organization or activity patterns as the direct-action land use and natural resource development and management programs. Geological Survey and NOAA activities generally are grouped into organizational work centers designed to best provide for the particular survey, service, investigation, observation and research efforts by broad program and geographic areas (e.g., West Coast, Gulf, East Coast, Central, etc.). Most field office activities are directed from Washington. However, it also must be recognized that there is an increasing need for and importance of action oriented hydrologic and geologic investigations, topographic mapping, weather services, environmental evaluation, natural hazard predictions, area studies, etc., which are of primary concern and benefit to natural resource and environmental management, to social and economic well-being, and to the public health and safety within each region, with national use of such services and information being of broader, less direct, and perhaps a longer time frame nature.

Since both types of needs must be met, there will be need for an operational structure in which major regional/national programs and activities would be continued under the existing nationally directed field structure but with a Regional Administrator who would be responsible for assuring that

regional needs are properly identified, incorporated into project and work plans, and are met in a timely manner consistent with other national and regional priorities.

The line management structure of OAESA will evolve to achieve conformance with the regional pattern established by the President on May 21, 1969. At the same time, further measures will be initiated by the Administration and the Department to provide instruments of regional coordination within resources and environmental fields. Examples would be the Regional Resource Councils presently being initiated by the Administration on a trial basis, and the apparatus recently established by Secretarial Order No. 2943 to provide for the Interior Department participation and support for regional comprehensive planning. It will be necessary, therefore, that OAESA provide for appropriate Administration-wide representation at the regional level. Major functions of the OAESA Regional Administrators would be (1) to provide a focal point for regional contact by clientele whose interests are sufficiently broad to require service or participation by a number of constituent agencies of OAESA; (2) to provide for effective representation of OAESA on regional councils or DNR regional activities; (3) to participate in regional planning activities; (4) to provide the Administrator with a regional outpost sensitive and responsive to his concerns of policies, and (5) accomplish specific regional projects as assigned by the Administrator.

The complexities and nature of OAESA activities will require explicit identification of the respective authorities and responsibilities of the national and Regional Administrators. This will be relatively unconventional from a pro forma organizational standpoint, but will be necessary to assure

program effectiveness and efficiency, adequate coordination and simultaneous meeting of both national and regional needs. Where there are existing regional centers such as Menlo Park, Denver, Seattle, Kansas City, New York, and the District of Columbia, it may be feasible to assign the Regional Administrator to the locations of the existing field center rather than to establish a separate Regional Administrator office, provided he is so located as to adequately meet all regional needs. The Regional Administrator would maintain close contact with the Land and Recreation, Water, Energy and Minerals, and Indian Regional Administrators to assure adequate coordination and support for their planning, development and management needs and activities.

8. OAESA RELATIONSHIPS WITH OTHER ELEMENTS OF DNR

Geological Survey and N0AA presently provide much information to resource and environmental action agencies throughout Government. A number of these agencies will be brought together within DNR. In most cases present arrangements between USGS and N0AA and their client agencies within DNR can continue without substantial change. However, in some cases improvements can be made and attention should be given to the special problems which certain DNR agencies will face.

It is characteristic of organizations that they tend to respond to any problem in terms of the competence which they possess. 0AESA would possess a competence greater than any of its constituent agencies. It is important that 0AESA's response to the needs of DNR agencies reflect this fact.

Many of the programs now carried on routinely by USGS and N0AA provide data, information, and analysis required by DNR action agencies to carry out their programs (Exhibit 6). 0AESA will need to evaluate its programs to make sure that their design is appropriate to the action agencies' needs and full benefit is derived from the broader range of scientific expertise, data, information and analysis capability which 0AESA will possess. Leadership in such review will be an important responsibility of the policy, planning and coordination staff activities.

Exhibit 6

Data Contributions of OAESA
Constituent Agencies to Other DNR Agencies

	NOAA					USGS				
DNR Agency	Oceanic and Earth Science	Aeronautical Navigational Bathymetric Geodetic Charts, Maps	Weather Service	Marine Fisheries	Environ. Research	Environ. Research	Geologic and Mineral Investigations	Water Resource Investigations	Topographic Mapping	Resource Management Conservation
LRRA										
Land Management										
Timber			X						X	
Range			X			X		X	X	
Recreation			X				X	X	X	
Fish and Wildlife		X		X	X	X		X	X	
Minerals		X					X		X	X
Soil Conservation			X		X	X	X		X	
Outer Continental Shelf	X	X		X			X			X
Environment	X	X	X	X	X	X	X		X	X
WRA										
Water Resource Management										
Flood Control			X		X			X	X	
Navigation		X						X	X	
Recreation (Water)		X				X		X	X	X
Fish and Wildlife		X		X	X	X		X	X	
Water Supply			X			X	X	X	X	X
Power			X			X	X	X	X	X
Soil Conservation			X		X			X	X	
Environment	X		X	X	X	X	X	X	X	
EMRA										
Minerals & Energy Management										
Mining Technology		X			X					
Mineral, Energy Supply		X				X	X		X	X
Mining Health & Safety										
Pipeline Safety		X				X	X		X	X
Mined Area Protection, Restoration					X				X	X
Waste Disposal, Storage, Recycling		X			X	X	X	X	X	X
Nuclear Power Development		X			X			X	X	
Uranium Supply							X		X	X

Similarly, these activities will provide a point of contact for other DNR agencies requiring assistance from OAESA, and will be the initial point of contact for requirements which do not clearly fit into the mission responsibilities of one of OAESA's constituent elements. As an illustration, consider requirements of the Water Resources Administration for flow data to be used in water resource planning investigations. Presently certain elements of these data are derived from Geological Survey's Water Resources Division and other elements from NOAA's Weather Service. Under DNR, it will be the responsibility of OAESA's management staff to assure that coordinated action is taken to provide an integrated array of data responsive to the planning requirement.

As a further example, land development planning with respect to Indian lands under the Indian and Territorial Affairs Administration may require a variety of resource and environmental data. In such case coordinated planning, involving the OAESA staff and that of the Indian and Territorial Affairs Administration may be required to effect a proper resolution.

In all the above cases, effective response to DNR agencies' needs is facilitated by the fact that the matter can be resolved within the DNR framework, rather than as at present through inter-Departmental coordinating mechanisms.

As a major developer and manager of resources, DNR will confront numerous important decisions involving resource

and environmental alternatives. In many cases the possible consequences of alternative action will not be obvious, nor will it be clear what technical perspectives are relevent to the problem. The wide spectrum of environmental and resource expertise available within OAESA can be a decisive factor in assuring that all ramifications of proposed action are identified and arrangements made for their analysis.

A somewhat special case exists with respect to relationships between the present Conservation Division of Geological Survey under OAESA and responsibilities of the Administrators of the Energy and Mineral Resources Administration and the land and Recreation Resource Administration. In this case the resource evaluations and the appraisal of mineral resources proposed for lease on the public lands and the OCS would be provided by OAESA. The responsibility for energy programs would rest with EMRA and that for land management with LRRA. The situation is not greatly different from that which presently exists within Interior. The primary difference is that Geological Survey's Conservation Division is presently under the general supervision of the Assistant Secretary for Mineral Resources, but under DNR would be a function of a separate Administration. Coordination between the three Administrations with respect to planning, budgeting, and policy will be essential to orderly conduct of the resource evaluation function under DNR. However, the existence of a strong planning

and management staff at both the OAESA and Departmental level provides a basis of confidence that adequate coordination and control can be achieved.

9. OAESA RELATIONSHIPS WITH OTHER DEPARTMENTS

Many of the above comments also apply to OAESA relationships with other Departments and agencies outside of DNR. The primary significance of OAESA's creation will be its ability to provide a broader and more adequate spectrum of information and analysis. The means of achieving this desired end will be available through the staff and liaison capability within the Administrator's office and at field level. In general, most clientele relationships will remain unchanged, but the means of marshaling the broader scientific and service capability of OAESA will exist at both Washington and field level.